Flash-Flood Guidance for Headwaters (FFH) – Computing Values

FFH and Gridded FFG share many common features. Please see the document for both programs: Common Features Shared by FFH and Gridded FFG

Description of Algorithm

http://www.weather.gov/ohd/hrl/nwsrfs/users_manual/part2/_pdf/24unithg.pdf

Utility Parameters

FFH uses an xml representation of model parameters. The parameters are divided into groups where:

a. (1 group: id="default"), this group is FFH parameter
b. (1-N groups: group id=XXXX, which is area id, FFH parameter assigns each area id a weight for calculating the ffg average value when running multiple areas): each group is one FFG parameter.

The single FFH xml parameter file consists of 2 or more groups (1 FFH parameter and at least 1 FFG parameter). The number of groups depends on how many areas are included in the calculation.

1) Common Features Shared by FFH and Gridded FFG

2) FFH specific parameters:

Name	Type	Required [Yes/No]	Comment
"Default" Parameters			
FFH_WEIGHT_AND_ AREA_ID_PAIR	Table	Yes	The table has two columns: "area id" (string) and its associated "weight" (double, between 0.0 and 100.0). When the FFH is a weighted average of more than one location's model results, multiple rows are needed. If only one row (FFH only runs one area), its weight value is ignored.
Parameters Related to Threshold Runoff Calculation [Static or Dynamic]			
FFH_UNIT_HG_PEAK_1_HR_IN _CFS_PER_INCH FFH_UNIT_HG_PEAK_3_HR_IN _CFS_PER_INCH FFH_UNIT_HG_PEAK_6_HR_IN _CFS_PER_INCH FFH_UNIT_HG_PEAK_12_HR_ IN_CFS_PER_INCH FFH_UNIT_HG_PEAK_24_HR_ IN_CFS_PER_INCH	Double [CFS/IN CH]	depends	Unit hydrograph peak flow in unit of CFS/INCH. If present, threshold runoff will be calculated **dynamically**: (flood flow – max forecast flow)/unit hydrograph peak
Following are only needed to be considered when threshold runoff dynamically calculated:			
FFH_USE_THRESHOLD_FO R_FLOOD_FLOW	Boolean	Yes for dynamic calculati on	if true, use the <thresholds> element in the header of input QINE time series as flood flow. If false, the parameter FFH_FLOW_AT_FLOOD_STAGE is required.
FFH_FLOW_AT_FLOOD_ STAGE	Double [CFS]	depends	Flow at flood stage. Required when FFH_USE_THRESHOLDS_FOR_FLOOD _FLOW is false.

2. Utility States

Please see: Common Features Shared by FFH and Gridded FFG

Utility Time Series

Please see: Common Features Shared by FFH and Gridded FFG

Notes about configuring Utility in FEWS workflow

FFH in FEWS uses the following configuration files

Workflow Configurations	
Configuration File	**Description**
*_FFH_Forecast.xml	1 to N (where N represents the number of FFH locations) workflow files that executes its corresponding FFH module configurations (i.e. FFH algorithm and MERGE)
ADJUSTQ_DUMMY_*_ Forecast.xml	Workflow to create dummy QINE data for FFH locations that do not have QINE time-series input. (these are created for NCRFC and MBRFC only)
Module Configurations	
Configuration File	**Description**
FFH_*_*_Forecast.xml	1 to N (where N represents the number of FFH locations) module configurations used to execute the FFH algorithm for a given FFH location
ADJUSTQ_DUMMY_*_ Forecast.xml	Used for FFH locations that do not have QINE time-series input. These module configurations are used to provide the QINE header, which contains the "Flood Flow" value. Note: These dummy module configurations are created for NCRFC and MBRFC only
Region Configurations	
Configuration File	**Description**
WorkflowDescriptors.xml	Used to provide a description of the workflows listed above
ModuleInstanceDescriptors. xml	Used to provide a description of modules listed above
ModuleInstanceSets.xml	Used to define 2 sets of modules • FFH_Forecast • FFHMerge_Forecast
LocationSets.xml	Used to define 1 new location set • FFH_LOCATIONS
Locations.xml	Used to ad N locations (where n represents the number of FFH locations) – note if the location already exist, no need to add it
Parameters.xml	Used to add "FFH" type
Module Parameter Configurations	
FFH_*_*_Forecast.xml	1 to N (where N represents the number of FFH locations) parameter configurations containing the parameter information for each location

Please see: Common Features Shared by FFH and Gridded FFG

Examples:
Configuration File
Config File
Parameter File
Parameter File

5. FEWS Adapter Used

The FFH utility uses the OHDFewsadapter to communicate. Information about this adapter can be found at OHDFewsadapter.